TITLE: POLE COVER OR SLEEVE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a conversion of and claims priority to prior United States Provisional Patent Application 60/396,479 filed July 17, 2002, herein incorporated by reference in its entirety.

I. BACKGROUND OF THE INVENTION

A. Field Of The Invention

The present invention relates to a covering or sleeve over the exterior of a pole, and, in particular, to a covering or sleeve which can either be retrofitted to existing erected poles or installed during manufacturing of the pole or portions thereof.

B. Problems in the Art

To elevate structures, there must either be existing superstructure from which to suspend the structure, or the same must be created. In the latter case, many times the most cost-effective way to do so is with a pole. A variety of pole types exist including, but not limited to, wood, tubular metal, and even concrete. Poles can range from relatively short (a few feet tall) to relatively tall (over 100 feet tall).

One popular type of pole is hollow metal. It can be relatively thin-walled for economy of material, yet is relatively strong. Steel is a common choice. It can be galvanized to resist corrosion.

However, even galvanized steel can lose resistance to corrosion over time, especially when exposed to outdoor environments. A similar problem exists for other metals. Even wood and concrete, to some extent, may deteriorate over time.

A conventional method to try to protect materials is to paint their exterior. However, paint may not be very effective. It is subject to deterioration. It is also subject to scratches and chips. Sometimes paint does not adequately adhere to the surface. Also, the degree of protection is many times directly related to how well it is applied. Still further, it has been found to be difficult or costly to try to paint galvanized metal poles to impart some protection of the same. This is especially true once the pole is erected.

Therefore, a need has been identified in the art for protection of poles against the elements.

Still further, galvanized metal poles tend to have essentially one relatively consistent color. It is sometimes desirable to have different colors. For example, it is sometimes desirable to match the color of poles to their surroundings (e.g. green for grass or trees). Another example would be to match pole colors to team colors or school colors. Other examples and reasons for coloring a pole differently than the ordinary color of the material from which it is made exist.

The need has been identified to add the option of different colors for poles, other than the natural color of their structural material. This is true both for retrofitting existing erected poles or during manufacturing of new poles.

There are other instances where it is desirable to alter the surface or texture of a pole material. For example, metal poles tend to be very smooth. It might be desirable to change the surface to have a certain textured surface or maybe even have some sort of

pattern which differs from that of the original structural material. Another example would be to attempt to provide a smoother surface than those of wood or concrete poles to deter splinters or scrapes.

Therefore, there is a need and an advantage believed to be existent relative to the state of the art for an apparatus and method which can alter or improve the aesthetic appearance of poles elevating structures to substantial heights. Further needs or advantages include the ability to provide protection to poles or otherwise protect the exterior of the natural material of poles, even to material which has been treated or manufactured to provide additional protection to the material (e.g. galvanization of tubular steel poles).

II. BRIEF SUMMARY OF THE INVENTION

The present invention relates to the concept of adding a cover or sleeve to poles, especially substantially tall poles. The cover can be installable in sections to cover some or all of the pole.

In accordance with the invention, an added-on covering can make a pole less susceptible to damage than if painted (for example, paint can be susceptible to scratching and chipping), including when loading or unloading poles, or setting poles into vertical positions. It can also be used to alter to customize the appearance or external surface of the pole.

The cover or sleeve can be retrofitted or included in the original assembly of the pole or its sections. Optionally, it can comprise a sheet of material that can be shaped to conform to the exterior circumference of a section of the pole. Still further there optionally can be hardware or structure that is adapted to lock or retain the sheet into

position when wrapped around the pole. Still further, there can be structure associated with the sheet and/or the pole to hold the sheet, wrapped around the pole like a sleeve or cover, against movement relative to the longitudinal axis of the pole.

The cover sheet can be used to for such things as to protect the pole, alter the surface of the pole, or alter the color of the pole.

III. DETAILED DESCRIPTION OF AN EXEMPLARY EMBODIMENT

A. Example of Existing Structure to Which Invention Can be Applied

Figure 1 illustrates generally a pole 10 of hollow tubular galvanized steel having a lower end 12 and an upper end 14. This pole is anywhere from around 30 to 100 or more feet in length. Cross arms 16 are welded or otherwise secured to the top 14 of pole 10. Light fixtures 18 are adjustably secured to cross arm 16. This general type of structure is well known in the art.

In this particular pole, galvanized steel tubular pole 10 is tapered from top to bottom with slightly increasing diameter there along. Pole 10 can be made of one piece or can be in sections. Figure 1 illustrates a particular type of pole and mounting system for the same of the type disclosed in U.S. Patent No. 5,600,537, which is co-owned by the owner of the present application, and which is incorporated by reference herein. A base 20, installed in a plumbed position in ground 19, includes a stub 22 having a taper that substantially matches the taper of the bottom 12 of pole 10. Pole 10 is seated upon stub 22 to support it in a plumbed vertical position. Many times a ballast box 60 or other electrical circuitry or components could be mounted on pole 10 or base 22 or cross arms 16. In figure 1, ballast box 60 is mounted along pole 10.

Therefore, figure 1 shows a hollow steel tubular pole 10, such as are in use to elevate structures to substantial heights, and to which the present exemplary embodiment of the invention can be retro-fitted.

B. General Structure of Exemplary Embodiment According to Invention

Figure 2 illustrates an embodiment of the invention installed on a pole 10 of the type of Fig. 1. A set of covers or sleeves are installed along the length (approximately 45 feet total length) of pole 10 from substantially its bottom 12 up to near the bottom-most cross arm 16 (see reference numbers 30 A-E). Each sleeve 30 A-E is substantially the same height (e.g. approx. 8 feet) and is made of a sheet of vinyl (0.040" or 1 mm thick) that has been wrapped around pole 10. Adjacent portions of each sleeve section 30A-E can be overlapped (e.g. 3"); preferable the lower edge of each succeeding higher section 30 overlaps the upper edge of each preceding section 30.

No sleeve section 30 would cover the slip-fit joint between adjacent poles sections. Those joints would remain metal to metal. But, succeeding bottoms of sleeve sections 30 would extend over tops of preceding sleeve sections 30 (and over the slip-fit pull joint) to shield the tops of the preceding sleeve sections 30.

As can be appreciated, covering substantially all of pole 10 tends to protect the surface of pole 10. Preferably, some method of sealing the top-most edge of each section 30, relative to the pole, can be used to further deter any moisture or water or debris from getting between the cover sections 30 and the pole. This could be with some sort of caulking or other sealant (e.g. silicone), or some sort of an elastic or malleable ring or cap.

C. Specific Structure of Exemplary Embodiment

Figure 3 shows sleeve sections 30 A-E in isolation and spread somewhat flat. As illustrated in Figure 3, for a tapered pole 10, each section 30 could be manufactured from a sheet of material in a trapezoidal shape such that when wrapped around pole 10, opposite vertical edges would essentially or generally be aligned parallel to the longitudinal axis of the pole. Each section 30 could be made of a slightly different outline shape for different sections of the pole to accommodate variations in the diameter of the pole from top to bottom (if a tapered pole). The dimension of each section 30 A-E could be predesigned for certain sized poles. The number of sections 30 would, of course, vary depending on the height of the pole, the diameter of the pole gradually reduces from bottom 12 to top 14. As illustrated in Figures 3-7, opposite edges 34 and 36 of each section 30A-E could be formed in a fashion to cooperate with an aluminum extrusion 40 which can be utilized to connect those edges by capturing or hooking those edges in parts of that extrusion.

Figures 4A-C shows the nature of edges 34 and 36 more precisely. Each edge is rolled under or rolled in the sense that it curves back towards the middle of the sheet 30 (see especially Figures 4B and 4C). In cross-section or end view, each edge 34 and 36 has somewhat "U" shape (e.g. aluminum 6063-T0 and 6063-T4; remove all burrs; break all edges and sharp corners .01 min.).

Figures 5A and B show in more detail aluminum extrusion 40. Extrusion 40 would be approximately the same length (8 feet approx.) of the up and down dimension of a sheet section 30 and, shown in figure 5A, somewhat of a "C" shape in cross section or by end view.

Figure 6A and B illustrate how extrusion 40 secures a sheet or sleeving section 30 to pole 10. First, a sleeving section 30 is wrapped around the desired part of pole 10. Extrusion 40 is placed with opposite walls 44 and 46 pointing away from pole 10 but along longitudinal axis of pole 10 on its exterior surface. In normal form, arms 44 and 46 of extrusion 40 are at the angle indicated in figure 5A relative to the base portion 42. This provides an opening along the longitudinal axis between walls 44 and 46 into which the U-shaped edges 34 and 36 of a sheet section 30 can be inserted (see figures 6A). Second, extrusion 40 is pushed up through adjacent formed edges 34 and 36 of sleeve 30 (see Figure 6A) until the top and bottom of extrusion 40 is generally aligned with the top and bottom of sleeve 30 respectively. This assumes that the sleeving section 30 selected relatively closely matches the perimeter circumference of pole section 10. Third, as indicated in figure 6B, the "soft" aluminum extrusion is "rolled" down (e. g. with a heavy rolling pin) to complete what will be called a seam. This pulls sleeve section 30 a bit tighter to pole 10 and flattens down the extrusion and ends 34 and 36 of the sleeve closer against the pole all along its 8 foot length.

As further indicated by figure 7, when the seam is created, sleeve section 30 becomes a conforming cover or sleeve around that part of pole 10.

D. Options and Alternatives

It will be appreciated that invention can take many forms and embodiments. Variations obvious to those skilled in the art are included within the invention.

As can be appreciated, different types of materials can be utilized for a cover or sheet. Dimensions can vary. One sheet could be used for an entire length of the pole. Alternatively, as indicated above, much smaller sections could be utilized.

Figure 6 and 7 illustrates that hole 54 can be pre-formed or created (e.g. drilled, punched) at the top of sleeve section 30. A metal screw 56 could be used to bite into pole 10 through hole 54 and pin sleeve section 30 at the top to pole 10. By pinning each sleeve section 30 near its top, it would prevent both rotation around pole 10 and movement longitudinally of sleeve section 30 along pole 10. But still further, as mentioned before, sleeve sections 30 can overlap each other. By pinning each section at the top, it allows the bottom of each section to expand or contract over temperature extremes freely, but the overlapping still covers areas between sleeve sections 30.

Alternatively a nut (not shown) could be welded or otherwise secured around a drilled hole in the side of pole 10. When sections 30 are wrapped around the pole, a hole performed or created in sheet section 30 can be aligned with the nut and hole combination on pole 10, and a screw or bolt inserted through the hole in sheet 30 and then turned into the nut to hold that section 30 against longitudinal movement relative to pole 10.

Figure 7 also shows that portions of sleeve section 30 could be pre-cut (before installation) or post-cut (during or after installation) around places needed for hubs, hand holes, mounting studs, or the like. In figure 7, hole 38 could be pre-formed in sleeve section 30B to accommodate a hub 66 for connection to ballast box 60. When wrapping sleeve section 30B, opening 38 would be aligned with hub 66 prior to installation of ballast box 60, and opening 38 would fit around that hub. See also figure 8A.

Figures 7, 8A and B illustrate additionally that an optional sealing ring 70, having an opening 72 that could fit around the exterior of hub 66, could be utilized to seal off any gaps created by opening 38 and sleeve section 30B. Ballast box 60 could be

mounted to hub 66 by bolting flanges 68 of hub 66 to flanges 63 of mounting portion 62 of ballast box 60. By inserting closed-cell silicone foam donut 70, or other sealing ring or structure, it would seal that combination off (particularly the hole 38 in sleeve 30B) from moisture. Preferably ring 70 would have a width that normally would exceed the distance between ballast box 60 and pole 10 such that when they are installed to one another ring 70 would compress and closely follow the contours of both ballast box 60 and the exterior pole 10 and exterior sleeve section 30B on pole 10.

Sheet 30 can be made of grade 510 or 550 Kydex® sheet, available from Kleerdex Company (Aiken, South Carolina, USA) or other commercial outlets. Kydex® is an extremely durable, acrylic/PVC alloy that offers excellent durability, resilience, chemical resistance, dimensional stability (e.g. low water absorption, relatively low coefficient of expansion), and flame-retardancy. It is also easy to machine and offers integral color, making it an ideal laminating material. It withstands impact, scratching, gouging and general abuse. It does not crack, break, chip, or snap and is available in a range of thicknesses (e.g. from .028" to .250"). However, it is bendable and can be post brake-formed or post-formed with or without wire heating to make seamless corners or fabricated into structural components using screws, rivets, commercially available adhesives, heat welding, and other common fasteners. It can be thermo formed. It is possible to saw, shear, rout, drill, sand, die-cut, mill, punch, machine, and file with conventional power tools. This vinyl material is UV resistant and has low thermal expansion. It can have some surfaced texturing. It can be embossed or have relief.

Kydex® can be purchased or created in a wide variety of colors. It comes in a variety of grades. It has clean ability and can take strong cleaners without fading, staining, or surface damage. It can include a weatherable cap.

Still further, as discussed above, the sleeve or cover could be used to cover only a portion of a pole or substantially all of the pole. Additionally, sections could be used to cover selected parts of base 20 and pole top 14. Additionally, some type of covering could be used to conform to the cross arms 14. Alternatively, the cross arms and/or base could be painted or otherwise colored to match or contrast with the color of the sleeves 30.

Colors can be selected to correlate to a desired concept. Some examples are (a) colors in the immediate environment around the pole, or (b) colors of some affiliation such as team, school, or sponsor.

Instead of a flat sheet of material, the material could be originally manufactured to have a cylindrical or truncated conical shape.

The cover or sleeve can be adapted to different pole sizes and shapes. For example, it could work with round, triangular, square or other cross-sectional pole shapes.

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